# ASSESMENT OF GROUND WATER QUALITY TEHSIL DIGOD, KOTA DISTRICT, RAJASTHAN

Joshi, Deepmala[1], Prahlad Dube and Shweta Nagar[2]
[1]Department of Chemistry, CP University, Kotam
[2]Principal, MD Mission College, Kota,

**Abstract**

The groundwater quality assessment is a significant issue in recent studies. Kota district is treated as blessed district in comparison to rest of Rajasthan state. During past two decades of present century many parts of Kota district experienced degradation of groundwater quality due to rapid urbanization and industrialization. For present study Ten ground water samples were collected randomly from 6 different area of Digod Tehsil, from different hand pumps to study the physicochemical parameters, such as pH, Conductivity, TDS, Total Hardness, NO3, F with the help of standard method of APHA during one year (October 2016 to September 2017). Present study shows that underground water quality of Digod tehsil is not average and can be used for household works.

## Introduction

Water is one of the most precious substances on earth. All living entities need water to survive. The life cannot exist without water on earth. Clean water is most important for drinking and for other purposes. The quality of water is significant especially for drinking purpose. The chemical, physical and bacterial characteristics of ground water determine its usefulness for municipal, commercial, industrial, agricultural, and domestic water supplies. Digod Tehsil (Longitude: 76.079803 E; latitude: 25.217220N), is undergoing urbanization and industrialization. Urbanization has led to immense pressure on ground water resources and has resulted in quality deterioration of ground water as well. The area experiences semi-arid to arid climate characterized by a hot and dry summer and pleasant winter.

## Review of Literature

Various workers in our country have carried out extensive studies on Water Quality. Abbasi [1] *et al.* and Jagdap Jyashri [11] *et al.* have studied water quality of different rivers. Shriniwas [20] *et al.* and Jha [13] *et al.* studied water quality in Hyderabad and Bihar, respectively. Patnaik [14] *et al.* reported water pollution in industrial area. Fluoride level in drinking water from various sources in and around Jaipur and in many villages and trace metals have been carried out in our laboratory [6–11] earlier. Studies of industrial wastewater and ground water and pollution problem in ground water have also been studied in our laboratory [12–13] recently. The objective of the scientific investigations is to determine the hydrochemistry of the ground water and to classify the water in order to evaluate the water suitability for drinking, domestic and irrigation uses and its suitability for municipal, agricultural and industrial use. Gupta [8] *et al.* studied assessment of physic chemical characteristics of hand pumps water of Banda city. Basavarajappa and Manjunatha [5] studied groundwater quality analysis in Precambrian rocks of chitradurg, Karnataka. Banerjee [4] studied groundwater fluoride contamination. Adnan and Iqbal [2] studied spatial analysis of groundwater quality in Pakistan. Bouderbala [6] *et al.* studied application of multivariate statistical techniques for characterization of groundwater quality. Elumalai [7] *et al.* studied assessment due to heavy metals in groundwater by pollution index and multivariate statistical methods.

## Materials and Methods

During monsoon period of one year ground water samples from eighteen sampling points were collected. Before collection from tube wells, the water was left to run for 5 to 7 minutes to get a representative sample. Samples were collected in good quality polyethylene bottles of one-liter capacity. Sampling has been carried out without adding any preservatives in well rinsed bottles. Geographical coordinates of each sampling location was recorded using a handheld Magellan Triton global positioning system (GPS). Various physicochemical parameters like temp., pH, Conductivity, Turbidity, Total Hardness and NO3, F test were determined at the Environmental lab. Unstable hydro chemical parameters including pH, electric conductivity (EC) and total dissolved solids (TDS) were measured in situ with the help of digital portable water analyzer kit (CENTURY–CK–710). Total hardness (TH) as CaCO3 was analyzed titrimetrically, using standard EDTA. Total Alkalinity (TA) as CaCO3 was estimated by titrating with H2SO4. Nitrate as NO3 was analyzed by ultralviolet screening. Fluoride as F was estimated by APHA (1985) method.

## Results and Discussion

pH is the measure of the acidity or alkalinity of solution. A pH of 7 is neutral; lower number indicates acidity whereas higher indicates alkalinity. During present investigation, it was observed from the pH value that water samples were varying from 8.3 to 8.5. In general, pH of groundwater samples of the study area is within the permissible limit. The electrical conductivity at 25ºC of water is due to the presence of various dissolved salts. EC of the groundwater is varying from 1228 to1244 µS/cm at 25°C. A high total dissolved solid (TDS) reduces utility of water for drinking, irrigation and industrial purposes [15]. TDS varied from 982 to 983 mg/L. TA varied from 614 to 622 mg/L. TH varied from 480 to 489 mg/L. Nitrate varied from 34 to 41 mg/L. Fluoride varied from 1.9 to 2.4 mg/L. According to Indian standards, 94.5% of the samples has exceeds the permissible limit and 5.5% of samples are within the permissible limit.

Higher value of TDS can be attributed to the contribution of salts from the subsurface lithology and further due higher residence time of groundwater in contact with the aquifer [2,3,4]. The hardness of water is defined as the soap consuming capacity of water. It is determined by the concentration of multivalent cations in water .Its permissible limit is 300 mg/l. From the results, it is observed that Hardness content is higher than permissible limit in 44 % samples. The Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye. From the results, it is observed that all the water samples are within the permissible limit. From the investigation, it has been concluded that excess concentration of EC, TDS, TA, TH, NO3 and F make the groundwater unfit for drinking without proper treatment.

Table: showing values of various parameters (site1, site2) of tehsil Digod

| Parameter / sites | Site 1 | Site 2 | Site 2 | Site 2 | Average |
|---|---|---|---|---|---|
| pH | 8.3 | 8.4 | 8.5 | 8.4 | 8.4 |
| EC | 1228 | 1230 | 1244 | 1242 | 1236 |
| TDS | 983 | 982 | 982 | 983 | 982.5 |
| TA | 614 | 618 | 620 | 622 | 618 |
| TH | 480 | 480 | 489 | 489 | 484.5 |
| NO3 | 34 | 32 | 41 | 43 | 37.5 |
| F | 1.9 | 2.0 | 2.4 | 2.3 | 2.15 |

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